

BHARATHIAR UNIVERSITY, COIMBATORE

B.Sc. Electronics Degree Course

Scheme of Examination (CBCS PATTERN)

For candidates admitted during the Academic Year 2010-2011 and onwards

SEM	Part	Sub Code	Subject and Paper	Instruction Hrs./Week	Examinations					
					Dur.Hrs.	CIA	Marks	Total Marks		
I	I		Language -I	6	3	25	75	100	4	
	II		English – I	6	3	25	75	100	4	
	III		Core : Paper I : Materials Science	5	3	25	75	100	4	
			Pract. I Basic Electronics Lab	3	-	-	-	-	-	
			Pract. II Semiconductor devices Lab	3	-	-	-	-	-	
IV		Allied : I Mathematics –I Environmental Studies #	5 2	3 3	25 -	75 50	100 50	4 2		
II	I		Language - II	6	3	25	75	100	4	
	II		English - II	6	3	25	75	100	4	
	III		Core Paper II : Basic Electronics	5	3	25	75	100	4	
			Pract. I Basic Electronics Lab	3	3	40	60	100	4	
			Pract.II Semiconductor devices Lab	3	3	40	60	100	4	
IV		Allied : II Mathematics – II Value Education – Human Rights #	5 2	3 3	25 -	75 50	100 50	4 2		
III	III		Core : Paper III : Semiconductor Devices	4	3	25	75	100	4	
			Paper IV : Digital Principles and Applications	4	3	25	75	100	4	
			Paper V : Electronic Circuits	4	3	25	75	100	4	
			Pract. III. Electronics circuits & Communication lab	4	3	25	75	100	4	
	IV		Pract. IV Digital & Medical Electronics Lab	3	-	-	-	-	-	
			Allied : III Programming in C	3	-	-	-	-	-	
			Pract. V Computer Programming Lab	4	3	20	55	75	3	
			Skill based Subject I: Computer Architecture and Organization	3	3	20	55	75	3	
		Tamil @ / Advanced Tamil# (OR) Non-major elective - I (Yoga for Human Excellence)# / Women’s Rights #	2	3	-	50	50	2		

IV	III	Paper VI : Principles of Communication Systems	4	3	25	75	100	4
		Paper VII : IC's and Instrumentation	4	3	25	75	100	4
		Paper VIII : Bio Medical Instrumentation	4	3	25	75	100	4
		Pract. III. Electronic circuits & communication lab	3	3	40	60	100	4
		Pract. IV Digital & Medical electronics Lab	3	3	40	60	100	4
		Allied: IV Object Oriented Programming using C++	4	3	20	55	75	3
	Pract. V : Computer Programming Lab	3	3	20	30	50	2	
IV	IV	Skill based Subject II: Visual Programming	3	3	20	55	75	3
		Tamil @ /Advanced Tamil # (OR)						
		Non-major elective -II (General Awareness #)	2	3	-	50	50	2
V	III	Paper IX : 8085 Microprocessor	6	3	25	75	100	4
		Elective – I	6	3	25	75	100	4
		Elective – II	6	3	25	75	100	4
		Pract. VI: IC, TV & Industrial Electronics Lab	3	-	-			
		Pract. VII: Microprocessor & Interfacing Lab	3	-	-			
		Pract. VIII: Microcontroller Lab	3	-	-			
	IV	IV	Skill based subject – III Internet and Java Programming	3	3	20	55	75
VI	III	Paper X : 8051 Microcontroller and Embedded Systems	5	3	25	75	100	4
		Elective - III	4	3	25	75	100	4
		Pract. VI: IC, TV & Industrial Electronics Lab	3	3	40	60	100	4
		Pract. VII: Microprocessor & Interfacing Lab	3	3	40	60	100	4
		Pract. VIII: Microcontroller Lab	3	3	40	60	100	4
		PROJECT	-	-	-	-	150*	6
	IV	IV	Skill based subject –IV Practical Visual and Java Programming	3	3	30	45	75
V	V	Extension Activities @	2	--	50	-	50	2
		Total					3500	140

@ No University Examinations. Only Continuous Internal Assessment (CIA)

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* for Project report 120 marks and viva-voce 30 marks.

List of Elective papers (Colleges can choose any one of the paper as electives)		
Elective – I	A	PCB design and Fabrication
	B	Advanced communication systems
	C	Computer Hardware and Maintenance
Elective – II	A	Television Engineering
	B	Microwave and fiber optic communication
	C	Automotive Electronics
Elective - III	A	Industrial Electronics
	B	8085 Microprocessor Interfacing & its Applications
	C	Design with PIC Microcontroller

SEM –I

Core Paper- I

MATERIALS SCIENCE

Subject Description : This subject is the introductory for Various Materials which plays vital role in the field of Electronics

Goals : Enable the students to learn the basic concepts of Materials Science

Objectives : Upon completion of the subject, the student should gain the knowledge about various materials and its bonding structure.

UNIT I CHEMICAL BONDS

Review of Atomic Structure – Interatomic Forces – Different Types of Chemical Bonds – Ionic or Electrovalent Bond – Covalent Bond or Homopolar Bond – Metallic Bond – Dispersion Bond – Dipole Bond – Hydrogen Bond

UNIT II DIELECTRIC MATERIALS

Introduction – Fundamental definitions in dielectrics – Different types of electric polarization – Temperature and Frequency Effects – Electric Breakdown – Ferroelectric Materials

UNIT III MAGNETIC MATERIALS

Introduction – Terminology and classification – Magnetic Moments due to Electron Spin – Ferromagnetism and Related Phenomena – The Domain Structure – The Hysteresis Loop – Soft Magnetic materials – Hard Magnetic Materials

UNIT IV SEMICONDUCTING MATERIALS

Introduction – Chemical bonds in semi conductors like Germanium and Silicon – Intrinsic and Extrinsic semiconductors – Carrier concentration in intrinsic Semiconductors - Carrier concentration in N type Semiconductors - Carrier concentration in P type Semiconductors.

UNIT V NEW MATERIALS

Introduction – Metallic glasses – Fibre reinforced plastics – Metal matrix composites – Optical materials – Materials for optical sources and detectors – Fiber optic materials and their applications – Display materials – Acoustic materials and their applications – SAW materials

TEXT BOOK:

1. M.Arumugam “**MATERIALS SCIENCE**”-Anuradha Agencies , 2nd Edition 1998.
2. Raghavan, “**Materials Science and Engineering**” – Eastern Economy Edition, 5th Edition 2008

SEM –II

Core Paper- II

BASIC ELECTRONICS

Subject Description : This subject is the introductory for electronics, it presents the basic components theorems, devices and circuit

Goals : Enable the students to learn the basics of Electronics

Objectives : Upon completion of the subject, the student should understand the Basic components and its operations Gain knowledge about Electric and Electronic circuits and Network theorems

UNIT I RESISTORS & INDUCTORS

Types of resistors: Fixed, Variable_ Brief mention of their construction and characteristics -Color coding of resistors-Connecting resistors in series and parallel.

Types of inductors: Fixed, Variable- Self and mutual inductance-Faraday's law and Lenz'slaw of electromagnetic induction-Energy stored in an inductor-Inductance in series and parallel-Testing of resistance and inductance using multimeter.

UNIT II CAPACITORS

Principles of capacitance-Parallel plate capacitor-Permittivity-Definition of Dielectric Constant-Dielectric strength-Energy stored in a capacitor-Types of capacitors: Air, Paper, Mica,Teflon, Ceramic, Plastic and Electrolytic: Construction and application-Connecting capacitors inseries and parallel-Factors governing the value of capacitors-Testing of capacitors using millimeters.

UNIT III ELECTRICAL ELEMENTS AND CIRCUITS

Potential difference- Electric current-Electromotive force-Ohms law-Kirchoff's law-Kirchoff's current law-Analysis of resistance in series circuits, parallel circuits and series parallelcircuits-Concept of voltage source and current source-Voltage source in series and current source inparallel-Simple problems in DC circuits.

UNIT IV NETWORK THEOREMS

Superposition theorem-Thevenin Theorem-Thevenizing a circuit with two voltage sourcesthevenizinga bridge circuit-Norton's Theorem-Thevenin Norton conversion-Conversion of voltageand current sources-Millman's Theorem-Star and Delta conversion-Maximum power transfertheorem-Simple problems in DC circuits.

UNIT V AC CIRCUITS

Introduction to Sinusoidal wave-RMS value-Average value-AC circuits with resistance-Circuits with XL alone -Circuits with XC alone-Series reactance and resistance-Parallel reactanceand resistance-Series parallel reactance and resistance-Real power-Series resonant circuit-Parallelresonant circuit-Q factor.Passive filters: Low pass filters, High pass filters, Band pass filters, Band rejection filters.

TEXT BOOK:

1. S.Salivahanan, N.Suresh Kumar, A.Vallavaraj "ELECTRONIC DEVICES AND CIRCUITS"-Tata McGraw-Hill Publishing Company Limited, New Delhi. 1998.

2. B.V.Narayana Rao “**PRINCIPLES OF ELECTRONICS**”, Wiley Eastern Limited, 1992.
3. B.L.Theraja, “**BASIC ELECTRONICS-SOLID STATE DEVICES**”, S.Chand Company Ltd. 2000
4. Bernard Grob “**BASIC ELECTRONICS**”-Tata McGraw-Hill Publishing Company Limited, 9th Edition.

SEM – I & II

Core Practical – I

BASIC ELECTRONICS LAB

(Any 16 Experiments)

1. Study of Multimeter – Checking of components.
2. Measurement of Amplitude, Frequency & Phase difference using CRO.
3. Verification of Ohm’s Law.
4. Voltage sources in series, parallel and series – Parallel.
5. Resistance in series, parallel and series – Parallel.
6. Voltage and Current dividers
7. Verification of Kirchoff’s Law.
8. Wheatstone Bridge.
9. Verification of Norton’s theorem.
10. Verification of Thevenin’s Theorem.
11. Verification of Millman’s Theorem.
12. Verification of Superposition Theorem.
13. LCR Bridge.
14. Series resonance circuit.
15. Parallel resonance circuit.
16. Transient response of RC Circuit.
17. Transient response of RL Circuit.
18. Capacitors & Inductors in series & Parallel.
19. Frequency response of R, L & c.
20. Low Pass Filter & High Pass Filter.
21. Band pass and Band Rejection Filter.
22. Verification of Maximum power transfer Theorem
23. Measurement of resistance and capacitance in series and parallel

SEM – I & II

Core Practical – II

SEMICONDUCTOR DEVICES LAB
(Any 16 Experiments)

1. Band Gap energy of Silicon / Germanium Diode.
2. V-I Characteristics of Junction Diode.
3. V-I Characteristics of Zener Diode.
4. Transistor Characteristics of CE Configuration.
5. Transistor Characteristics of CB Configuration.
6. Transistor Characteristics of CC Configuration.
7. Clipping Circuits.
8. Clamping Circuits.
9. Measurement of stability factor of Fixed Bias.
10. Measurement of stability factor of Self Bias.
11. V-I Characteristics of JFET.
12. V-I Characteristics of UJT.
13. UJT as Oscillator.
14. FET as Voltage Variable Resistor (VVR).
15. Characteristics of LDR.
16. Characteristics of Solar Cell.
17. Study of IR (Tx & Rx).
18. Study of LED and 7 Segment display.
19. Temperature Co-efficient of Junction Diode.
20. Zener as a Voltage regulator.
21. ON / OFF control of relay using Opto – Couplers.
22. Characteristics of SCR
23. TRIAC Characteristics

SEM –III

Core Paper- III

SEMICONDUCTOR DEVICES

Subject Description : This subject is the introductory for electronic devices, it presents the basic components devices and circuits

Goals : Enable the students to learn the basics of Electronic devices

Objectives : Upon completion of the subject, the student should understand the Basic components and its operations Gain knowledge about Electric and Electronic circuits and devices

UNIT I PN JUNCTION DIODE

Energy band Structure and conduction in Insulator - Semiconductor, conductor - Intrinsic and Extrinsic semiconductor – doping – P type – N type semiconductor - Formation of PN Junction diode - Forward bias - Reverse bias condition – characteristics - Clipping and Clamping.

UNIT II SPECIAL DIODES

Zener diode - VI Characteristics – Breakdown - Backward diode - Varactor diode - Step recovery diode - Point contact diode - Scott key diode - Tunnel diode - Gunn diode - Impaat diode - PIN diode - PNP diode.

UNIT III BJT

Introduction to Bipolar Junction Transistor – Construction - Transistor Biasing - Operation of NPN and PNP transistor - CB, CE & CC configuration - Bias stability - Load line. Method of Biasing: Fixed bias - Collector to base bias - Voltage divider bias – Bias compensation - Thermal Runaway - Heat sink.

UNIT IV FET AND UJT

Introduction to FET - Construction and operation of N-channel JFET - Drain characteristics - Comparison of JFET & BJT - Introduction to MOSFET - Enhancement MOSFET – Depletion MOSFET - FET as a voltage variable Resistor(VVR) - Introduction to UJT – Characteristics – UJT as relaxation oscillator - Introduction to PUT – SCR – TRIAC – DIAC

UNIT V OPTOELECTROIC DEVICES

Principles, operation and characteristics of opto electronic devices: LDR – Photo diode - Photo Transistor – Photo Voltaic cell – Solar Cell – Photo Emissive sensors – Vacuum Photo tube – Gap filled photo tube – Photo Multiplexer – LED – IR Emitter – LCD – Opto – Couplers.

TEXT BOOK:

1. S. Salivahanan, N. Suresh Kumar, A. Vallavaraj, “ELECTRONICS DEVICES AND CIRCUITS”, Tata McGraw Hill Publishing Company Limited, New Delhi, 8th edition.
2. S. L. Kakani, K. C. Bhan Dai “A TEXT BOOK OF ELECTRONICS”.
3. B. L. Theraja, “BASIC ELECTRONICS – SOLID STATE DEVICES”, S.Chand & Company Ltd. 2000.

SEM – III

Core Paper – IV

DIGITAL PRINCIPLES AND APPLICATIONS

Subject Description : The design of the subject is to impart the knowledge about code conversion,

Boolean algebra, logic gates, combinational and sequential logic, and converters.

Goals : Enable the students to design the logical circuits

Objectives : Upon Completion of the subject, the student should be able to Convert one Number system to another number system, Construct truth tables for logic gates, Simplify Boolean expression, Write VHDL coding for logic circuits

UNIT I NUMBER SYSTEM AND CODES

Decimal, Binary, Octal and Hexa Decimal numbers – Conversion – Floating point representation – Binary addition, Subtraction and Multiplication – 1's and 2's compliments. Binary Coded Decimal (BCD) – Weighted codes and Non-weighted codes – Excess three – Grey code – Error detection codes – Hamming codes – ASCII codes – EBCDIC codes – Hollerith code – Parity advantages.

UNIT II BOOLEAN ALGEBRA AND LOGIC GATES

Boolean logic operations – Boolean functions – Truth Tables – Basic laws – DeMorgans theorem – Sum of Products and Products of Sums – Karnaugh map – Logic gates – OR, AND, NOT, NAND, NOR, EX-OR AND EX-NOR GATES – Code conversion – VHDL Coding for Logic gates.

UNIT III COMBINATIONAL LOGIC CIRCUITS

Half adder – Full adder – Half subtractor – Full subtractor – Parallel binary adder – 4 bit binary adder / subtractor – BCD adder – Multiplexer – Demultiplexer – Decoders – Encoders – Parity generators / checkers – Magnitude comparators – VHDL coding for Combinational Circuits

UNIT IV SEQUENTIAL LOGIC CIRCUITS

Flip Flops – RS, Clocked RS, JK, JK Master Slave, D and T Flip Flops – Shift Registers and its types – Ring counters – Ripple counters – Synchronous counter – Up down counter – Mod-3, Mod-5 counters – Decade counter – Applications.

UNIT V D/A AND A/D CONVERTERS

Digital to Analog converters: Resistive divider type and Ladder type – Accuracy and Resolution. Analog to Digital converters: Counter – Ramp type – simultaneous conversion – Dual slopotype – Successive approximation type – Accuracy and resolution.

TEXT BOOKS

1. Malvino & Leech, "DIGITAL PRINCIPLES AND APPLICATIONS", Tata McGraw Hill Edition V, 2002.
2. M.Morris Mano "DIGITAL LOGIC AND COMPUTER DESIGN" PHI 2005.
3. M.Morris Mano "DIGITAL DESIGN" PHI 2005.

SEM – III

Core Paper – V

ELECTRONIC CIRCUITS

Subject Description : This subject describe the classification and operation of amplifiers, oscillators, rectifiers and filter circuits

Goals : Enable the students to become an electronic technician and circuit designer

Objectives : Upon completion of the subject, the student should be able to design and troubleshoot the amplifiers, oscillators, power supply and filters

UNIT I REGULATORS

Half wave, Full waves and bridge rectifiers – Calculation of RMS value – Average value – Ripple factor – Efficiency – Transformer utility factor – Peak inverse voltage – Inductor filter – Capacitor filter – LC filter – π filter. Voltage doubler– Voltage regulator – Zener diode shunt regulator – Transistor shunt and series regulator – Overload protection – Construction of DC power supply

UNIT II SMALL SIGNAL AMPLIFIERS

CE, CB, CC amplifiers – Calculation of I/P resistance, O/P resistance – Current gain -Voltage gain – power gain – single stage transistor amplifier – DC and AC load line – RC coupled amplifier – RC coupled amplifier – gain frequency response – bandwidth – transformer coupled amplifier – impedance matching – FET amplifier.

UNIT III POWER AMPLIFIERS

Operation and graphical representation of Class A, Class B, Class C and Class AB amplifiers – Maximum collector efficiency of class A power amplifier – Collector dissipation curve – Harmonic distortion – Class B push pull amplifier – Crossover distortion – Complementary symmetry push pull amplifier

UNIT IV FEEDBACK AMPLIFIERS

Basic concepts of feedback – Positive feedback – Negative feedback – Effects of negative feedback on gain, bandwidth and distortion – Noise – Voltage series feedback - Voltage shunt feedback – Current series feedback – Current shunt feedback

UNIT V OSCILLATORS AND MULTIVIBRATORS

Barkhausen criterion – Hartley Oscillator – Colpitts oscillator – Phase shift oscillator – Weinbridge oscillators –Peizo electric crystal and it effects – Crystal oscillator. Astable multivibrator – Monostable multivibrator – Bistable multivibrator – Schmitt trigger.

TEXT BOOK

1. S.K. Sahdev, “Electronic Principles”, Dhanpat Rai & Co (P) Ltd, 2nd Edition, 1998
- 2 B.L.Theraja, “**BASIC ELECTRONICS**”, S.Chand Company Ltd.2000
- 3 BernardGrob “**BASIC ELECTRONICS**”-Tata McGraw-Hill Publishing Company Limited,9th Edition.

SEM – III

Skill based Subject – I

COMPUTER ARCHITECTURE AND ORGANIZATION

Subject Description : This subject presents the Modern computer organization, Processor and memory design, Peripherals and recent system architecture.

Goals : Enable the students to learn the newest computer technology and trends.

Objectives : Upon Completion of the subject, the student should : Gain the knowledge of Processor and Memory Design and understand the recent computer organization and architecture

UNIT 1 MODERN COMPUTER ORGANIZATION

Introduction – Layers in modern computer - Computer organization – Main Memory – CPU Operation – Computer types – System performance and measurement – High performance techniques – Booting sequence – Computer design process – Computer structure – Computer Function – Architecture and Organization – CISC Vs RISC

UNIT 2 PROCESSOR DESIGN AND DATA PATH

Introduction – Processor role – Processor design goals – Processor design process – Data path organization – Main memory interface – Local storage register file – Data path simple instructions

UNIT 3 MEMORY DESIGN AND MANAGEMENT

Introduction – Memory parameters – Classification of memory – Memory Technology – Main memory allocation – Static RAM IC – Dynamic RAM – ROM logic – Multiple memory decoding – Memory Hierarchy – Main memory drawbacks – Cache memory – Principle of cache – Virtual memory Concept – Advantage of Virtual memory

UNIT 4 COMPUTER PERIPHERALS

Introduction – Keyboard – CRT display monitor – Printer – Magnetic storage devices – Floppy disk drive – Hard disk drive – Special types of disk drives – Mouse and Track ball – Modem – CD-ROM Drive – Scanner – Digital Camera – DVD – Special peripherals

UNIT 5 ADVANCED SYSTEM ARCHITECTURE

Introduction – High performance computer architecture – RISC systems – Superscalar architecture – VLIW architecture – EPIC architecture – Multiprocessor Systems

TEXT BOOK

1. Govindarajalu.B “Computer Architecture and Organization Design Principles and Applications” Tata McGraw-Hill, 2006

SEM – IV

Core Paper – VI

PRINCIPLES OF COMMUNICATION SYSTEMS

Subject Description : An important consideration in the design of the subject is to

Provide knowledge about communication medium, transmitter, receiver and modulation techniques

Goals : Enable the students to learn the basic principles used in communication systems

Objectives : After successful completion of the course the students should understand the concepts and techniques in communication systems

UNIT I MODULATION TECHNIQUES

Need for modulation – Amplitude modulation – Modulation factor – Analysis of AM wave – Side band frequencies – Transistor AM modulator – Power in AM wave – Limitation – Frequency modulation – Analysis of FM wave.

UNIT II TRANSMITTERS

Block diagram of AM Transmitter – Single sideband principle – Balanced modulator – SSB generation – FM generation – Direct and indirect methods.

UNIT III RECEIVERS

Super heterodyne principle – Image rejection – Choice of IF and oscillator frequencies – Tracking – Block diagram of AM receiver – FM receiver – SSB receiver

UNIT IV ANTENNA

Qualitative theory of short dipole antenna – Radiation power – radiation resistance – Radiation pattern – Grounded and ungrounded antenna – folded dipole – Yagi uda antenna – Helical antenna – Rhombic – Horn – Fan dipole and Parabolic reflectors

UNIT V PROPAGATION OF RADIO WAVE

Reflection and refraction of radio waves: Reflection of radio waves at the surface of the earth – Ground or surface wave propagation – Space wave propagation – Sky wave propagation – Structure of Ionospheric Layer – Skip distance – Maximum Usable Frequency (MUF)

TEXT BOOKS

1. Kennedy Davis “ ELECTRONIC COMMUNICATION SYSTEMS” Tata McGraw Hill Publishing Company Limited, New Delhi.
2. Dennis Roddy, Hohn Coolen “ ELECTRONIC COMMUNICATIONS” Prentice Hall of India Private Limited, New Delhi. 4th edition, 1995.
3. Ashok raj “ MODERN ELECTRONIC COMMUNICATION” Theory & Systems, Umesh Publication, 2001.

SEM – IV

Core Paper – VII

IC'S AND INSTRUMENTATION

Subject Description : The design of the subject is to impart the knowledge on IC fabrication, Timer, PLL, Op-amp., transducers and electronic instruments.

Goals : Enable the students to acquire the knowledge of IC fabrication, and its application in electronic circuits and know the measurements using electronic instruments

Objectives : Upon Completion of the subject, the student should : Understand the IC fabrication, Design circuits with ICs and Gain knowledge about electronic instruments.

UNIT I IC FABRICATION TECHNOLOGY

Fundamentals of Monolithic IC technology – Basic planar process – Wafer preparation – Epitaxial growth – Oxidation – Photolithography – Diffusion of impurities – Isolation techniques – Metallization – Monolithic transistors – Integrated resistors – Integrated capacitors- integrated. Inductors- Thin and Thick film technology

UNIT II TIMER AND PLL

Functional block diagram of 555 timer – Monostable operation – Applications: – Linear ramp generator – Pulse width modulator – Astable operation – Applications: Schemitt trigger – FSK Generator Phase locked loop: Functional block diagram – Phase detector / Comparator – Voltage Controlled Oscillator – Low pass filter – Applications: Frequency multiplier/Division – AM detection

UNIT III OPERATIONAL AMPLIFIER

Inverting and non inverting amplifier – Op-amp parameters – Summing Amplifier – Difference Amplifier – Integrator – Differentiator – Instrumentation Amplifier – Voltage to current converter – Current to Voltage converter – Precision half wave rectifiers – Precision full wave rectifiers.

UNIT IV TRANSDUCERS

Introduction – Electrical Transducer – Basic requirements of Transducer – Classification of transducers – selection of transducers – resistive transducers – potentiometers – Thermistors – Thermocouple – LVDT – RVDT – Piezoelectric transducers – hall effect transducers – Photoelectric transducers – digital displacement transducers.

UNIT V ELECTRONIC INSTRUMENTS

Q Meters- CRO: Block Diagram – cathode ray tube – Measurement of frequency – Measurement of voltage and current – Digital Oscilloscope – digital voltmeter: Ramp type DVM – dual slope integrating type DVM – Digital multimeter – Humidity and humidity measurement – Measurement of PH.

TEXT BOOKS

1. D.Roy Choudhury and Shahil B Jain, “Linear Integrated Circuits”, Second Edition New Age International Publishers 2004.
2. K.R.Botkar, “Integrated Circuits”, 10th Edition Khanna Publishers 2006.
3. J.B.GUPTA “A course in electronic and electrical measurements and instrumentation”, 12th Edition, S.K Kataria & sons

SEM – IV

Core Paper – VIII

BIO-MEDICAL INSTRUMENTATION

Subject Description : The design of the subject is to impart the knowledge on Biomedical Equipments like Biopotential Recorders , Pacemakers, Diathermy equipments and biotelemetry

Goals : Enable the students to acquire the knowledge on diagnostic and therapeutic equipments in the field of Biomedical Instrumentation

Objectives : Upon Completion of the subject, the student should : Understand the knowledge about Biomedical Equipments

UNIT I

Cells and their structure – transport of ions through the cell membrane – resting and action potentials – characteristics of resting potential – bio electric potentials – nerve tissues and organs. Design of medical instruments – component of bio medical instrument system – electrodes – half cell potential – purpose of electrode past – electrode material – types of electrodes: Microelectrode – micropipette – needle electrode – surface electrode – chemical electrodes.

UNIT II

Bio potential recorders: Introduction – characteristics of recording system – writer and pen damping effects – ECG origin of cardiac action potential – ECG lead configuration – ECG recording setup – practical considerations for ECG recording – analysis of recorded ECG signals – vector cardiography.

UNIT III

Phonocardiography: Echocardiography – electroencephalography (EEG) – origin of EEG – brain waves – placement of electrodes – recording setup – analysis of EEG – electromyography (EMG) – rerecording setup – electroretinography (ERG) and electrooculography (EOG)

UNIT IV

Pacemakers – energy requirements to excite heart muscle – methods of stimulation – different modes of operation – pacemaker batteries – artificial heart valves – different natural heart valves – different types of artificial heart valves – defibrillators – different types of defibrillators – heart lung machine

UNIT V

Introduction to diathermy – surgical diathermy – short-wave diathermy – microwave diathermy – ultrasonic diathermy Introduction to biotelemetry: elements of biotelemetry system – design of biotelemetry – audio telemetry system – problems in telemetry – uses of telemetry.

TEXT BOOKS

1. Leslie Cromwell, Fred J Weibell, Erich A. Pfeiffer, “BIOMEDICAL INSTRUMENTATION AND MEASUREMENTS” PHI second edition.
2. Dr. M. Arumugam “BIO MEDICAL INSTRUMENTATION” Anuradha Agencies second edition.

SEM – III & IV

Core Practical – III

ELECTRONIC CIRCUITS & ELECTRONIC COMMUNICATION LAB

(Any 16 Experiments)

ELECTRONIC CIRCUITS

1. DC regulated power supply using Zener diode
2. Voltage doubler
3. Feedback amplifier
4. Emitter follower
5. Transformer coupled amplifier
6. Hartley Oscillator
7. Colpitts oscillator
8. Phase shift Oscillator
9. Wein Bridge oscillator
10. RC coupled amplifier
11. Half wave and full wave rectifier
12. Filter circuits

ELECTRONIC COMMUNICATION

13. Performance of IF Amplifier
14. AM Modulation and Detection
15. FM Modulation and Detection
16. PAM modulation
17. PIN diode oscillator
18. Alignment of dish antenna
19. Alignment of satellite receiver
20. PWM modulation
21. PPM modulation
22. PCM modulation
23. GUNN diode oscillator

SEM – III & IV

Core Practical – IV

DIGITAL & MEDICAL ELECTRONICS LAB

(Any 16 Experiments)

DIGITAL ELECTRONICS

1. Verification of basic gates and universal gates
2. Verification of Demorgan's Theorem
3. Half adder and full adder
4. Half subtractor and full subtractor
5. 4-bit binary adder
6. Multiplexer and De multiplexers
7. Encoder and Decoder
8. BCD to 7-segment Display
9. Study of Flip Flops
10. Binary to Grey and Grey to Binary conversion
11. Shift registers and ring counter
12. Analog to Digital converter
13. Digital to Analog converter
14. Design and Simulation of Logic Gate using VHDL Coding
15. Design and Simulation of Adder Circuits using VHDL Coding
16. Design and Simulation of Encoder and Decoder using VHDL Coding
17. Parity checker and generator
18. 4 bit binary counter
19. Decade counter
20. BCD counter/ adder

MEDICAL ELECTRONICS

21. Pulse Rate Monitor.
22. Temperature monitor using AD 590
23. ECG Measurement
24. Notch filter
25. Pacemaker

SEM – IV

Skill based Subject – II

VISUAL PROGRAMMING

Subject Description : The subject presents windows programming, visual basic programming, Visual c++ programming, ODBC and GUI

Goals : Enable the students to learn the Visual programming

Objectives : After successful completion of the course the students student acquire knowledge about visual programming and able to program the applications using VB and VC++

UNIT I

Introduction to Windows Programming – Event Driven Programming – Data Types –Resources – Window Message – Device Context – Document Interfaces – Dynamic Linking –Software Development Kit (SDK) Tools – Context Help.

UNIT II

Visual Basic Programming – Forum Design – VBX Controls – Properties – Event Procedures – Menus and Toolbars – Using Dialog Boxes – Working with Control Arrays – Active X Controls – Multiple Documents Interface (MDI) – File System Controls – Data Control – Database Applications.

UNIT III

Visual C++ Programming – Frame Work Classes – VC++ Components – Resources – Event Handling – Message Dispatch System – Model and Modeless Dialogs – Important VBX Controls – Document view Architecture – Serialization – Multiple Document Interface – Splitter Windows – Coordination between Controls

UNIT IV

Database Connectivity – Min Database Applications – Embedding Controls in View creating user defined DLL's – Dialog Based Applications – Dynamic Data Transfer Function – Data Base Management with ODBC – Communicating with other applications – Object Linking and Embedding.

UNIT V

Basics of GUI Design – Visual Interface Design – File System – Storage and Retrieval System – Simultaneous Multi Platform Development

TEXT BOOKS

1. Petzold, “Windows Programming”, Microsoft Press, 1995.
2. Marion Cottingham, “Visual Basic”, Peachpit Press, 1999.
3. Kate Gregory, “Using Visual C++”, Prentice Hall of India Pvt. Ltd.

REFERENCES

1. Pappar and Murray, “Visual C++: The Complete Reference”, Tata McGraw Hill, Delhi,2000.
2. Brian Siler and Jeff Spotts, “Using Visual Basic 6”, Prentice Hall India, Delhi, 2002.

SEM – V

Core Paper – IX

8085 MICROPROCESSOR

Subject Description : This subject presents the architecture, Programming in 8085ALP and real world applications of the 8085 microprocessor

Goals : To enable the students to learn the instruction set, programming, and interfacing concepts of 8085microprocessor

Objectives : On successful completion of the course the students should have: Developed the programming skills in 8085ALP Understood the interfacing concept memory, & I/O devices. Understood the concept of microprocessor based system design

UNIT I MICROPROCESSOR ARCHITECTURE

Microprocessor architecture and its operation – Memory map of 1k memory chip – memory and instruction fetch – 8085 microprocessing unit – Bus timings – Demultiple4xing the bys AD 7 – AD0 – Generating control singles – Functional Block diagram of 8085.

UNIT II TIMINGS AND INSTRUCTION SET

Decoding and Execution of an instruction – 8085 based microcomputer – Timing of the memory write cycle and read cycle – Opcode fetch cycle timing – Instruction classification – Instruction format – addressing modes.

UNIT III PROGRAMMING THE 8085

Data transfer operations – arithmetic operations – Logical operations – Branch operations – Looping, counting and indexing – addition, subtraction of 8 and 16 bit numbers.

UNIT IV TIME DELAY

Time delay using a single register – Time delay using a register pair – Counter design of Time delay program. Function of PUSH, POP, CALL and RET instructions.

UNIT V MEMORIES

Semiconductor memories – Classification – ROM, RAM – Static RAM – Dynamic RAM – PROM – EPROM – EEPROM – CCD – Magnetic Bubble memories.

TEXT BOOKS

1. Computer System Architecture – M.Morris Mano – PHI 3rd Edition.
2. Ramesh S Goanker, “Microprocessor Architecture Programming and Application with 8085/8080A. New Age International (P) Ltd.

SEM – V

Skill based Subject – III

INTERNET & JAVA PROGRAMMING

Subject Description : The design of the subject is to provide knowledge about internet, Java data types, classes and files

Goals : Enable the students to learn the internet concept and Java programming systems

Objectives : After successful completion of the course the students should Gain knowledge about the concepts of Internet and able to program the applications using Java

UNIT I

Internet – Introduction- Understanding Internet- Internet Addressing - Hardware Requirements to Connect to the Internet

UNIT II

Data types, Arrays, Operators, Flow control – Branching, Looping

UNIT III

Classes – New Operator, Dot Operator, Method Declaration and Calling, Constructors, This In Constructors, Inheritance, Super, Method Overriding Final, Finalize, Static, Package and Import Statement, Interface and Implements

UNIT IV

Exception Handling – Exception Types, Uncaught and Calling, Nested Try Statements, Java Thread Model, and Thread, Runnable, Thread Priorities, Synchronization, Deadlock

UNIT V

File – Input Stream, Output Stream, and File Stream. Applets-Tag, Order of Applet Initialization, Repainting, Sizing Graphics- Abstract Window Tool Kit Components

TEXT BOOKS

1. Harley Hahn, The internet complete reference, Tata McGraw publicity, 2nd Edition, 1997
2. Patrick Naughton., “ Patrick Naughton”, Then Java hand book, Tata McGraw, 1997

SEM – VI

Core Paper –X

8051 MICROCONTROLLER AND EMBEDDED SYSTEMS

UNIT I

Microprocessor and Microcontroller – 8051 Microcontroller hardware:

8051 Oscillator and clock – Program counter and data pointer – A & B CPU register – Flags & PSW – Internal memory – Internal RAM – Stack and stack pointer – Special function registers – Internal ROM – Input/ Output pin, ports and circuits – External memory

UNIT II PERIPHERAL

Counter & Timer: Timer/Counter interrupts – Timing – Timer modes of operation – Counting – Serial data input/output: Serial data interrupt – Data transmission – Data reception – Serial data transmission modes Interrupts: Timer flag interrupt – Serial port interrupt – External interrupt – Reset – Interrupt control – Interrupt priority – Interrupt destination – Software generated interrupts

UNIT III ARITHMETIC AND LOGICAL OPERATIONS

Introduction – Addressing modes – Byte level logical operations – Bitlevel logical operations – Rotate and swap operations – Simple programs. Arithmetic Operations: Introduction – Flags – Increment and decrementing – Addition – Subtraction – Multiplication and Division – Simple programs **INSTRUCTION SET** Introduction – External data move – Code memory read only data move – Push & pop – Opcodes – Data exchanges – Simple programs. Jump and call instruction: Introduction – Jump and call program range – Jumps – Calls and subroutine – Interrupt and returns – More detail on interrupts – Simple programs.

Unit IV : Introduction to Real-Time Operating Systems

Tasks and Task States – Task and Data- Semaphores and Shared Data. **More Operating System Services:** Message Queues, Mailboxes, and Pipes – Timer Functions – Events – Memory Management – Interrupt Routines in an RTOS Environment

Unit V : Basic Design Using a Real – Time Operating System :

Overview – Principles – An Example – Encapsulating Semaphores and Queues – Hard Real – Time Scheduling Considerations – Saving Memory Space – Saving Power.**Embedded Software Development Tools:** Host and Target Machines – Linker/Locators for Embedded Software – Getting Embedded Software into the Target System.

TEXT BOOKS:

1. Kenneth J. Ayala, “ The 8051 Microcontroller architecture, programming and application” 2nd Edition, Penram International
2. David E. Simon “An Embedded Software Primer” Pearson Publications.

REFERENCE BOOKS:

1. V.Vetrivel “8051Microcontroller-Architecture & Programming” Pallavi Publications,Chennai.
2. M.Mahalakshmi “ The 8051 Microcontroller architecture, programming and its application” Laxmi Publications, New Delhi.

SEM – V & VI

Core Practical – VI

IC, TV AND INDUSTRIAL ELECTRONICS LAB
(ANY 16 EXPERIMENTS)

IC LAB

1. Astable multivibrator using 555
2. Monostable multivibrator using 555
3. Inverting and Non Inverting amplifier
4. Adder and Subtractor using IC 741
5. Instrumentation Amplifier
6. Voltage to Current Converter and Current to Voltage
7. Wein Bridge oscillator using IC 741
8. Square wave and Triangular generator
9. Schmitt Trigger using IC 741

TV LAB

10. Video IF section of TV Receiver
11. EHT Generation
12. Sync Separator
13. Horizontal Section faults
14. Vertical Section faults
15. Tuner Section faults
16. Video Section faults
17. Picture tube basing faults
18. Video IF section faults

INDUSTRIAL ELECTRONICS LAB

19. Automatic Street light
20. Single Phase Inverter
21. DC Choppers (Step up and Step down)
22. R and RC Triggering
23. External Pulse Commutation
24. DC motor controller and Light Dimmer
25. Time delay circuit

SEM – V & VI

Core Practical – VII

MICRO PROCESSOR AND INTERFACING LAB
(ANY 16 EXPERIMENTS)

8085 MICROPROCESSOR LAB

1. Addition / subtraction of 8 / 16 bit data.
2. Multiplication / division 8 bit data.
3. Block data transfer.
4. Smallest / largest of N numbers.
5. To arrange in ascending / descending order.
6. Sum of N 8 bit numbers.
7. 1's and 2's compliment of an array (8 / 16 bit).

8. UP/DOWN counter using 7 segment displays.
9. Traffic light control interface.
10. Data transfer using 8255 (PPI).
11. Square wave generator using 8255.
12. ADC interface.
13. DAC interface.
14. Stepper motor interface.
15. Solid State Relay Interface
16. Time Delay Programme
17. Digital Clock
18. Rolling and Blinking of a message
19. LCD interface
20. Frequency Counter
21. Water level Indicator
22. DC motor interface
23. Temperature controller

SEM – V & VI

Core Practical – VIII

MICROCONTROLLER LAB
(ANY 16 EXPERIMENTS)

8051 MICROCONTROLLER LAB

1. Addition / subtraction of 8 / 16 bit data.
2. Multiplication / division 8 bit data.
3. Block data transfer.
4. Smallest / largest of N numbers.
5. To arrange in ascending / descending order.
6. Sum of N 8 bit numbers.
7. 1's and 2's compliment of an array (8 / 16 bit).
8. UP/DOWN counter using 7 segment displays.
9. Traffic light control interface.
10. Wave form generation.
11. ADC interface.
12. DAC interface.
13. Stepper motor interface.
14. Solid State Relay Interface
15. Time Delay Programme
16. Digital Clock
17. Rolling and Blinking of a message
18. LCD interface
19. Frequency Counter
20. Water level Indicator
21. DC motor interface
22. Temperature controller

SEM – VI

Skill based Subject - IV

VISUAL AND JAVA PROGRAMMING LAB

VISUAL PROGRAMMING (ANY 8 EXPERIMENTS)

1. Building Simple Applications using Basic Tools.
2. Working with Intrinsic Control and Active X controls.
3. Create an Application with multiple forms and dialogs.
4. Write a VB program to design an e-mail registration form.
5. Create an Application with Menu editor.
6. Create an Application with DAO controls
7. Create an Application using Common dialogs.
8. Write a program for Drag and Drop Events.
9. Create a Database for library management using ADD controls.
10. Creating an application using Active X control.
11. Create a Scientific calculator in VB.
12. Develop a VB application to either link or embed MS Word document to an OLE control.
13. Display Student information using Grid control.
14. Create an Application using RDO controls.
15. Develop an application to perform the following operation in the Employee table using DAO.
 - i) Add a new Record.
 - ii) Delete a Record.
 - iii) Modify a Record.

JAVA PROGRAMMING (ANY 8 EXPERIMENTS)

1. Program to print the following triangle of numbers
1

12

123

1234
2. Defining a class with the following attributes 1. xname 2. Date of Birth 3. Date on which leg injection has to be given (sixty days from date of birth) 4. xdate on which polio drops is to be given (45 days from Date of birth). Write a constructor to construct the baby object. The constructor must find out the leg and polio drops dates from the date of birth. In the main program define a baby and display its details.

SEM – V

Elective I – A

PCB DESIGN AND FABRICATION

UNIT I TYPES OF PCB

Single sided board – double sided – Multilayer boards – Plated through holes technology – Benefits of Surface Mount Technology (SMT) – Limitation of SMT – Surface mount components: Resistors, Capacitor, Inductor, Diode and IC's.

UNIT II LAYOUT AND ARTWORK

Layout Planning – General rules of Layout – Resistance, Capacitance and Inductance – Conductor Spacing – Supply and Ground Conductors – Component Placing and mounting – Cooling requirement and package density – Layout check.

Basic artwork approaches – Artwork taping guidelines – General artwork rules – Artwork check and Inspection.

UNIT III LAMINATES AND PHOTO PRINTING

Manufacture of copper clad laminates – Properties of laminates – Types of Laminates – Manual cleaning process – Basic printing process for double sided PCB's – Photo resists – wet film resists – Coating process for wet film resists – Exposure and further process for wet film resists – Dry film resists

UNIT IV ETCHING AND SOLDERING

Introduction – Etching machine – Etchant system.

Soldering: Principles of Solder connection – Solder joints – Solder alloys – Soldering fluxes.

Soldering Tools: Soldering, Desoldering tools and Techniques – Man Soldering – Solder mask – Safety, health and medical aspects in Soldering practice.

UNIT V DESIGN RULES AND AUTOMATION

Reflection – Crosstalk – Ground and Supply line noise – Electromagnetic interference from pulse type EM fields and automation – Automated artwork drafting – CAD.

Text Books:

1. Walter C.Bosshart "PCB DESIGN AND TECHNOLOGY" Tata McGraw Hill Publications, Delhi. 1983
2. Clyde F.Coombs "Printed circuits Handbook" III Edition McGrawhill.
3. R.G.Gupta "Electronic instruments and system" Tata McGraw Hill Publication. NewDelhi.

SEM – V

Elective I – B

ADVANCED COMMUNICATION SYSTEMS

UNIT I DATA COMMUNICATION

Introduction – Data Forms – Transmission Modes – Simplex, Half Duplex – Full Duplex – Point to Point Network – Star Network – Ring Network – Bus Network – Telephone Lines – Dial-up Lines – Dedicated Lines – Data Communication System – Asynchronous and Synchronous Transmission – USART's and ACIA's – RS 232 inter connect cable – Modems – Protocols

UNIT II PULSE COMMUNICATION

Basic concepts of pulse modulation – Sampling Theorem – PAM – PTM – PFM – PPM – PCM – Differential PCM – Delta Modulation – Adaptive Delta modulation – TDM – FDM – ASK – FSK – PSK

UNIT III SATELLITE COMMUNICATION

Introduction – Satellite Orbit – Satellite Position – Up link – Down link – Cross link – Assignable Satellite Frequencies.

Inside Satellite: Transponder – Antenna System – Power Package and Station Keeping – Forms of Modulation – Free path space losses – Ground Station – Aligning the satellite dish

UNIT IV CELLULAR COMMUNICATION SYSTEM

Introduction Cellular Mobile System – Basic Cellular System – Operational Cellular System – Maximum number of Calls per cell – Maximum number of Frequency channels concept of frequency channel cell splitting – permanent splitting – real time splitting – Frequency Management – Channel Assignment

UNIT V OPTICAL COMMUNICATION

Introduction to Optical fibers – Optical fiber structure – Numerical aperture – Propagation of light rays through it – Application of Optical Fiber (Video link, Satellite link, Computer link, Communicating antenna Television link)

TEXT BOOKS:

1. Robert J. Shoernbeck, "Electronic communications modulation and transmission", PHI, 1999
2. Anok Singh, "Principles of communication Engineering", S.Chand and Company, 2nd edition
3. Sanjeev Gupta, "Electronic Communication system", Kanna publishing company
4. William C.Y.Lee, "Mobile Cellular Communication systems", McGraw Hill Publications, 1995
5. Subir Kumar Sarkar "Optical Fiber Communication systems", S.Chand and Company

SEM – V

Elective I–C

COMPUTER HARDWARE AND MAINTENANCE

UNIT I COMPUTER HARDWARE OVERVIEW

Introduction – Computer organization – PC hardware – Functional block of a PC – Buses – Bus concept – Bus cycle – Bus interface unit – Peripheral devices – Keyboard – CRT display – Monitor – Printer – Floppy disk drive – SMPS

UNIT II MOTHER BOARD FUNCTIONS

Introduction – Functional units and inter communication – Reset logic – CPU nucleus logic – DMA logic – Wait state logic – Bus arbitration logic – RAM logic – NMI logic – Speaker logic – Mode switch input logic – New generation mother board

UNIT III FLOPPY DISK CONTROLLER

Introduction – Floppy disk controller overview – Disk format – FDC system interface – FDD interface – Overall operation of floppy disk subsystem – New generation floppy disk controller

Display adapter introduction – CRT display – 6845 CRT controller – CGA & AGA – Device interface

UNIT IV HARD DISK CONTROLLER AND PRINTER

Introduction – Overview of HDC organization – Disc drives types and interface – Hard disk card – Hard disk format

Printer introduction: Centronics interface programming – Programming sequence – Hardware overview – Printer controller

UNIT V TROUBLE SHOOTING

Introduction – Types of faults – Hardware and software – Nature of faults – Solids and intermittent – Fault elimination process – Systematic troubleshooting – FDC & HDC problems – CRT monitor problems – Keyboard problems – SMPS problems.

TEXT BOOK

1. Govinda Rajulu B, “PC IBM and Clones – Hardware, Troubleshooting and Maintenance”, Tata McGraw Hill Publishing Company Ltd., New Delhi, 1991

SEM – V

Elective II –A

TELEVISION ENGINEERING

UNIT I TELEVISION STANDARDS

Geometric form & Aspect ratio of the picture – Vertical scanning – Horizontal scanning – Number of scanning lines – Interlaced scanning – Vertical and horizontal resolution –negative modulation – Complete Channel bandwidth – Reception of VSD Signals – allocation of Frequency band for TV signal Transmission – Standards of TV System – Complete channel bandwidth – Composite video signal – CCIR – B standards – camera tubes.

UNIT II TELEVISION RECEIVER SECTION

Monochrome receiver block diagram – Receiving antennas – Balun – IF Filters RF tuners – VHF Stage and Response – Video detector – sound section – video amplifiers DC restoration – Picture tubes.

UNIT III SYNC SEPARATOR

Sync separator – Basic principle – Noise in sync pulses – Vertical and horizontal sync separation – Automatic frequency Control (AFC) – Horizontal AFC – Vertical and horizontal output stage – EHT generation.

UNIT IV COLOUR TELEVISION

Nature of color – Color perception – Compatibility – Three color theory – Chromaticity diagram – Luminance and color difference signals – weighting factors – color picture tube – Bandwidth for color signal transmission – PAL Color TV systems- Block diagram of color TV Receiver.

UNIT V ADVANCE TECHNIQUES

CCD camera – HDTV – Digital TV – Video Disc – Cable TV – Video Cassette Recorder.

TEXT BOOKS

1. R.R. Gulati, "MONOCHROME AND COLOUR TELEVISION", New Age International (P)Limited, Publishers, New Delhi.
2. R.R. Gulati, "MODERN TELEVISION PRACTICE", New Age International (P) Limited, Publishers, New Delhi.
3. R.R. Gulati, "COLOUR TELEVISION PRINCIPLES AND PRACTICE", New Age International (P) Limited, Publishers, New Delhi.
4. SP Bali, "COLOUR TELEVISION THEORY AND PRACTICE", Tata McGraw Hill Publishing Company Limited New Delhi, V edition 2002.

SEM – V

Elective II –B

MICROWAVE AND L FIBER OPTIC COMMUNICATION SYSTEMS

UNIT I INTRODUCTION TO MICROWAVES

Introduction – Maxwell’s equation – Amperes law – Faradays law – Gauss law – Wave equation – Types of wave guides – TE and TM modes – Propagation of TM waves in rectangular wave guide – TM modes in rectangular wave guides.

UNIT II MICROWAVE AMPLIFIERS AND OSCILLATORS

Microwave tubes: - Two cavity Klystron – Multi cavity Klystron – Reflex Klystron – Traveling wave tube (TWT) – Backward wave Oscillator (BWO) – Magnetron – Applications

UNIT III MICROWAVE DEVICES

Microwave transistors – Gallium Arsenide (GaAs) metal semi-conductor FET – Varactor Diode – PIN diode – Schottky diode – Tunnel diode – Gunn diode – IMPATT diode – TRAPATT diode – BARITT diode – Maser principle – Applications

UNIT IV RADAR

Introduction – Block diagram – Classification – Radar range equation – Factors affecting the range of a radar receivers – Line pulse modulator – PPI (Plane Position Indicator) – Moving Target Indicator (MTI) – FM CW Radar- Applications.

UNIT V OPTICAL FIBER COMMUNICATION

A basic fiber optic system – Frequencies – Fiber optic Cables – Refraction – Numerical Aperture – Graded index cables – Single mode – Multi mode – Cable Constructions – Cable losses – Connectors – Light Sources – Light Detector – Systems Components – Advantages and Disadvantages.

TEXT BOOKS

1. Kennedy; Davis – “ELECTRONIC COMMUNICATION SYSTEMS” Tata McGraw Hill Publishing Company Limited, III edition.
2. Robert J Schoenbeck “ELECTRONIC COMMUNICATIONS MODULATION AND TRANSMISSION”, PHI,1999

REFERENCE

- 1.M.Kulkarni – “MICROWAVE AND RADAR ENGINEERING” Umesh Publications, 2nd edition.
2. Samuel Y.Liao – “MICROWAVE DEVICES AND CIRCUITS” PHI Private Limited, 2nd edition.
3. Anikh Singh – “PRINCIPLES OF COMMUNICATION ENGINEERING” S.Chand & Company Limited, 2nd Edition

SEM – V

Elective II –C

AUTOMOTIVE ELECTRONICS

UNIT I Introduction :

Automotive component operation Electrical wiring terminals and switching Multiplexed wiring systems Circuit diagrams and symbols. Charging Systems and Starting Systems : Charging systems principles alternations and charging circuits New developments requirements of the starting system Basic starting circuit.

UNIT II Ignition systems:

Ignition fundamental, Electronic ignition systems. Programmed ignition distribution less ignition direct ignition spark plugs. Electronic Fuel Control : Basics of combustion Engine fuelling and exhaust emissions Electronic control of carburation Petrol fuel injection Diesel fuel injection.

UNIT III Instrumentation Systems:

Introduction to instrumentation systems Various sensors used for different parameters sensing Driver instrumentation systems vehicle condition monitoring trip computer different types of visual display

UNIT IV Electronic control of braking and traction:

Introduction and description control elements and control methodology Electronic control of Automatic Transmission: Introduction and description Control of gear shift and torque converter lockup Electric power steering Electronic clutch.

UNIT V Engine Management Systems:

Combined ignition and fuel management systems Exhaust emission control Digital control techniques Complete vehicle control systems Artificial intelligence and engine management Automotive Microprocessor uses. Lighting and Security Systems: Vehicles lighting Circuits Signaling Circuit Central locking and electric windows security systems Airbags and seat belt tensioners Miscellaneous safety and comfort systems

TEXT BOOK

1. TOM DENTON, Automobile Electrical and Electronic Systems, Edward Arnold pb., 1995

REFERENCES

1. DON KNOWLES, Automotive Electronic and Computer controlled Ignition Systems, Don Knowles, Prentice Hall, Englewood Cliffs, New Jersey 1988.
2. WILLIAM, T.M., Automotive Mechanics, McGraw Hill Book Co.,
3. WILLIAM, T.M., Automotive Electronic Systems, Heiemann Ltd., London ,1978.
4. Ronald K Jurgen, Automotive Electronics Handbook, McGraw Hill, Inc, 1999.

SEM – VI

Elective III –A

INDUSTRIAL ELECTRONICS

UNIT I THYRISTORS AND THEIR OPERATIONS

Principles and operations of SCR – Voltage amplifier gate characteristics of SCR – Characteristics of two transistor models – Thyristor construction – Rectifier circuit using SCR – GTO – Operation and characteristics of DIAC – TRIAC – Silicon Controlled Switch – Silicon Unilateral Switch – Silicon Bilateral Switch – Light activated SCR

UNIT II TURN ON/OFF MECHANISM

Types of turn on methods: AC gate triggering: R triggering – RC triggering – DC gate triggering – Pulse triggering – Types of turn off methods: Natural commutation – Forced Commutation: Self Commutation – Complimentary commutation – Auxiliary commutation – External pulse commutation – Line commutation – Thyristor rating

UNIT III APPLICATION OF SCR

Multiple connections of SCR – Series operation – Triggering of series connected SCR – Parallel operation – Triggering of parallel connected SCR – SCR di/dt calculation – Snubber circuit – dv/dt calculation across SCR – Types of converters – Half wave rectifiers with resistive load – HWCR with inductive load – HWCR with free wheeling diode – Full wave controlled rectifier with resistive load – FWCR with inductive load – FWCR with free wheeling diode

UNIT IV INVERTORS

Types of invertors – Single phase bridge inverter – Mc Murray impulse communication inverter – Single phase half bridge voltage source inverter – Single phase full bridge voltage inverter – Step down choppers – Step up choppers – Chopper classification

UNIT V APPLICATIONS

Induction heating – Resistance welding – Over voltage protection – Zero voltage switch – SMPS-UPS-DC circuit breaker – Battery charger – AC static switch – DC static switch – Time delay – Fan regulator using TRIAC

TEXT BOOKS:

1. Harish C Rai, “ Power Electronic Devices, Circuits, Systems and Applications”, Gac Gotia Publication Pvt. Ltd., 1st Edition, 1998
2. Ramamourthy “ Thyristor and their applications” East-West Publishers, 2nd Edition
3. Shamir K Datta “ Power Electronics and Controllers” PHI, 3rd Edition

SEM – VI

Elective III –B

**ELECTIVE III 8085 MICROPROCESSOR INTERFACING & ITS
APPLICATIONS**

UNIT I MICROPROCESSOR ARCHITECTURE

Microprocessor architecture and its operation – Memory map of 1k memory chip – memory and instruction fetch – 8085 micro processing unit – Bus timing-Demultiplexing the bus AD₇ – AD₀ – Generating control signals – Functional Block diagram of 8085.

UNIT II TIMINGS AND INSTRUCTION SET

Decoding and Execution of an instruction – 8085 based microcomputer – Timing of the memory write cycle and read cycle – Opcode fetch cycle timing – Instruction classification – Instruction format – addressing modes - Data transfer operations – arithmetic operations – Logical operations – Branch operations – Looping, counting and indexing – addition, subtraction of 8 and 16 bit numbers – Time delay program.

UNIT III INTERFACING CONCEPTS

Peripherals I/O instruction – device selection and data transfer – input interfacing – interfacing I/P using decoders – interfacing O/P display: LED display – 7 segments LED display –Interfacing memory bus contention memory time and wait states.

UNIT IV PERIPHERALS

The 8255A Programmable peripherals interface: Block diagram of 8255A, Mode 0 Simple i/p or o/p BSR mode, Programming the 8255A in mode1, mode 2 – Bidirectional data transfer – The 8259 Programmable Interrupt Controller – Block diagram of 8253 – Direct Memory access and the 8257 DMA Controller – 8279 Keyboard/Display Interfacing.

UNIT V APPLICATIONS

Application of Microprocessors – System Requirements – Overall System design and software design, Temperature Monitoring System – Data acquisition system – Traffic light control system– Stepper Motor control – Digital clock – Washing machine control.

TEXT BOOKS

1. Ramesh S Goanker, Microprocessor Architecture Programming and Application with 8085/8080A, 2nd Edition, New Age International (P) Ltd.
2. Aditya. P. Mathur, Introduction to Microprocessors, 3rd Edition.
3. S.Malarvizhi, Microprocessor and Its Application, II edition, Anuradha Agencies Publications, March 2006.

SEM – VI

Elective III –C

DESIGN WITH PIC MICROCONTROLLERS

UNIT I CPU Architecture and Instruction Set

Overview – Harvard Architecture and Pipelining – Program Memory Considerations – Register File structure and Addressing modes – CPU registers – Instruction set – Simple operations.

UNIT II Loop Time Subroutine, Timer2 and Interrupts

Timer2 use – Interrupt Logic – Timer2 Scaler initialization – IntService Interrupt Service Routine – Loop time subroutine.

UNIT III External Interrupts and Timers

RB0/INT External Interrupt input – Timer0 – Compare mode – Capture mode – Timer1/CCP Programmable Period Scaler – Timer1 External event counter – Timer1 and Sleep mode – PulseWidthModulated Outputs – PortB change interrupts.

UNIT IV I/O Port Expansion

Synchronous Serial Port Module – Serial Peripheral Interface – Output port expansion – Input port expansion – LCD display.

UNIT V I² Bus for Peripheral Chip Access

I² Bus operation - I² Bus subroutines – DAC output – Temperature sensor – Serial EEPROM.

Text Books:

1. John B. Peatman " Design with PIC Microcontrollers “, Pearson Education Publishing.